

Winter Operations Keep 'Em Moving

Program to Clear Critical Routes Has Gotten a Snowy Workout This Season



Caltrans photo courtesy of District 10

A Caltrans snow blower clears massive drifts that built up on Highway 88 in Alpine County after a series of major storms deluged the state in January. The effort is part of Caltrans' Winter Operations Program that seeks to keep state roadways clear and safe during bad weather.

After a historic dry period, winter returned with a fury to California this season. Caltrans' Winter Operations Program was ready for the challenge to keep motorists and commerce moving on state highways.

In fact, Caltrans deployed more and better equipment for this winter's onslaught than ever before. The department also used newer technologies to minimize the environmental impact of snow and ice removal operations.

The mission of the department's Winters Ops Program, as it's called, is critically important, and that was no more apparent than when a series of major storms pounded California in January and February. Caltrans crews responded quickly and worked around the clock as heavy snow, rain and high winds impacted roadways around the state.

Making sure there's enough people and equipment to clear the roads during and after major weather events is a year-round undertaking for Caltrans. Winter Ops also help fulfill several key goals of Caltrans' 2015-2020 Strategic Management Plan; namely, by improving travel time reliability, contributing to

freight system efficiency and the overall economic health of California, and using "green" strategies to protect the environment.

Caltrans' Office of Emergency Management and Infrastructure Protection (OEMIP), under the Maintenance Division, oversees the Winter Ops Program and coordinates weather preparation plans with the Caltrans districts that receive snowfall. The program is fully operational between November and April of the following year.

Because conditions vary so widely in the state, each district's winter preparation plan is different. For coastal or interior regions, contingencies for flooding and mudslide/landslide events take precedence based on historic weather trends. Low-lying highways susceptible to flooding, high tides and slides are identified in advance.

The challenge of higher-elevation highways

It's the mountainous parts of the state, however, that present a unique challenge to keep traffic flowing when bad weather arrives. The Caltrans dis-

tricts with higher-elevation highways have a longer winter checklists than their low-land counterparts: snow and ice clearance, staffed chain control, road de-icer/abrasives applications, avalanche monitoring and response, rock slide and erosion patrols, flood traffic control and monitoring, and other weather-related events.

Caltrans spent \$18.5 million in the 2015/16 fiscal year on snow removal efforts as part of its Winter Ops Program. The size and scope of the job is enormous: About one-fifth of Caltrans total inventory of 50,000-plus lane miles in California are classified as winter routes (a total of 9,060 lane miles), and some of those highways that traditionally see the stormiest weather are also among the most heavily traveled and economically important corridors in the state. The portion of Interstate 5 known as the Grapevine linking Southern and Central California, and Interstate 80 and Highway 50 crossing the Sierra Nevada, considered the state's primary trans-Sierra routes, are critical passages for interstate commerce that can't afford to be shut down for long.

To keep higher-elevation roadways clear, Caltrans has assembled a formidable snow and ice fighting arsenal. It starts with trained workers: The Maintenance Division has more than 5,000 field employees who are called upon to respond to weather-related

events at any time. Seasonal workers also are hired to bolster the department's cold-weather workforce. However, because of an improved economy, coupled with a wave of retirements, maintaining adequate staffing — especially during periods of bad weather — is challenging.

Snow removal vehicles made, modified in-house by Caltrans

Caltrans has a massive inventory of snow-clearing machines and heavy equipment — an array that includes more than 1,250 snow plows of different sizes, almost 200 road graders that can push aside tons of ice and snow, 70-plus snow blower vehicles, seven rotary ice breakers recently purchased to cut through compacted ice on road surfaces, and specialized trucks that spread materials such as salts, abrasives such as sand or lava rock cinders, or salt brine to reduce ice buildup or give better traction on highways.

The department, through its Division of Equipment, also introduces new, customized equipment each year to upgrade snow and ice fighting efforts. Caltrans' main equipment shop in Sacramento builds many vehicles from the ground up ahead of the winter season, turning out specialized plows able to clear more snow from the roads — definitely



Snowplows were in a waiting position at Caltrans' Kingvale Maintenance Station off Interstate 80 in anticipation of a predicted major storm in early December. Caltrans has a large inventory of vehicles and machinery for snow and ice removal, and tests out new equipment every winter.

a timely addition for this winter — and outfitting existing vehicles with new safety features to better protect workers in dangerous conditions. Each district also has its own equipment shops that keep snow-fighting machinery and related gear in top working order.

Road treatments such as de-icing agents and grit materials are a costly but necessary expense to keep ice from building up and creating potentially deadly driving conditions. About \$5.23 million was spent on those materials in 2015-16. Caltrans has been working actively to reduce the environmental impact from salts or abrasives, either by using more effective natural products in smaller amounts, or employing newer technology such as road temperature gauges on vehicles so treatments can be applied more selectively.

Caltrans also strives to keep de-icing materials and abrasives from escaping and settling in the surrounding environment. At yard storage sites, straw bales and storm wattle tubes are placed around materials stockpiles to contain any runoff. In especially sensitive areas, such as roads near Lake Tahoe, drains outfitted with special filters catch much of the salt/sand mixture carried away by melting runoff, which is then collected by Caltrans crews. In addition, snow that collects along treated roads is swept following storms and brought to facilities with holding ponds to separate the grit and salt.

High-tech gives heads-up on conditions ahead

Evolving technology also has aided travel time reliability for motorists who encounter adverse weather conditions. Caltrans delivers highway condition updates through its Intelligent Transportation System network that includes 834 changeable message signs, 2,333 closed circuit cameras accessible on the public website, and 182 highway advisory radio stations. Before they leave their home, drivers can get online updates via Caltrans' QuickMap app about their chosen route and adjust plans accordingly, or, once on the road, receive information on the conditions ahead. It's all part of Caltrans' mission to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

Another important part of Caltrans' preparations

ahead of anticipated severe weather is use of the service known as DOTSWAN, short for the Department Of Transportation Severe Weather Alert Notification. Through DOTSWAN, reports from the National Weather Service about potentially dangerous systems are compiled by OEMIP's Emergency Operations Branch and distributed to the department's executives and affected Caltrans districts that can take action.

The department has always tracked the effectiveness of its snow removal operations statewide through a Snow Level of Service (LOS) program. In the past, only snow and ice impacts were considered. Starting with the 2016 winter season, the department is moving to an all hazards approach that will address a wider range of weather-related calamities such as flooding, slides and wind. **MM**

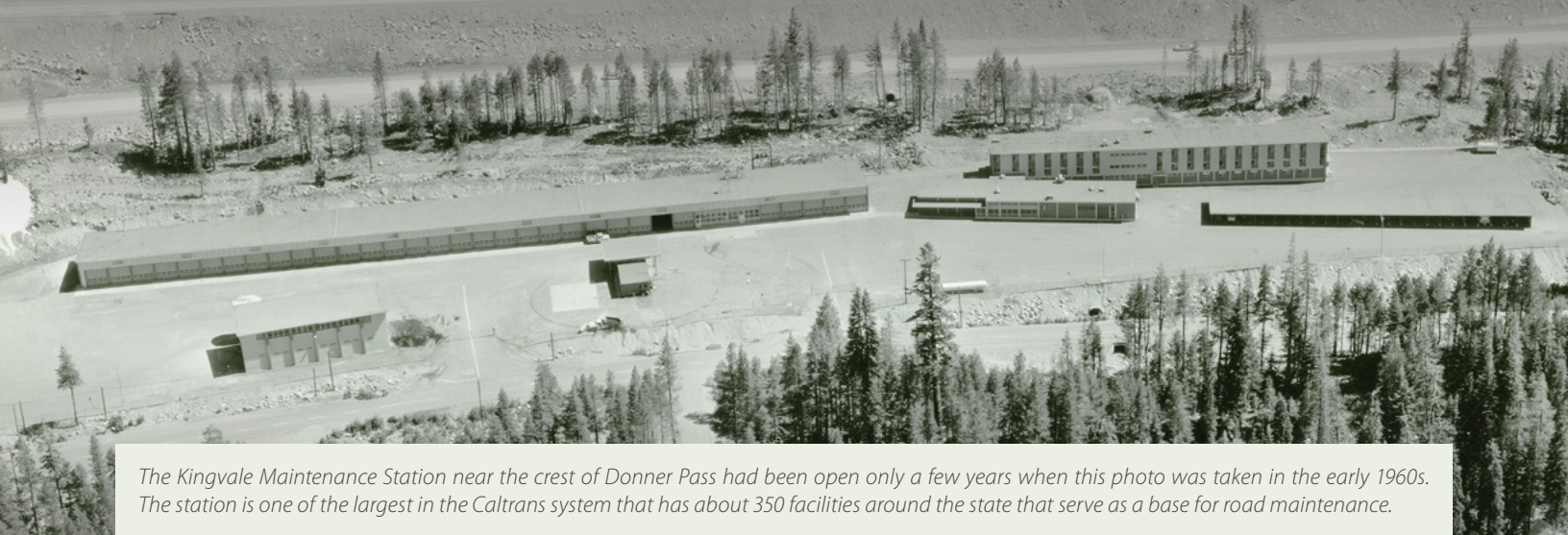
Source: Division of Maintenance, Office of Emergency Management and Infrastructure Protection, Winter Operations Chief Chris Smith, Branch Chief David Frame

Winter Operations Program Facts

\$18.5 mil	Annual Snow & Ice Budget
9,060	Lane Miles of Winter Routes
5,000-Plus	Caltrans Employees Who Respond to Weather Events
1,025	Snow Plows
238	Wing Plows
2	Tow Plows
193	Graders
77	Snow Blowers
2	"Epoke" Spreaders
7	Ice Breakers

Kingvale Maintenance Station

Facility Off Interstate 80 Is Nerve Center for Travel Over Key Trans-Sierra Pass



The Kingvale Maintenance Station near the crest of Donner Pass had been open only a few years when this photo was taken in the early 1960s. The station is one of the largest in the Caltrans system that has about 350 facilities around the state that serve as a base for road maintenance.

No place better demonstrates Caltrans' winter readiness than its Kingvale Maintenance Station on Interstate 80 near the Donner Pass, where an average of 430 inches of snow fall each year.

Busy I-80 not only links the Bay Area and Sacramento Valley to the frosty playgrounds of Lake Tahoe and northern Nevada, it's also an important freight route, carrying some \$4.7 million of goods and commerce every hour.

The Kingvale Maintenance Station, like the other 350-plus maintenance stations that Caltrans operates in California, represents the department's commitment to improving the performance of the state transportation system, as outlined in the 2015-2020 Strategic Management Plan. By keeping roads clear during times of adverse weather and other conditions, the maintenance stations do their part to improve travel time reliability that's a key part of the overall system performance goal while maintaining the safety of workers and the traveling public.

The Kingvale Maintenance Station, opened in 1962, tends about 20 miles of highway between the city of Truckee and Yuba Gap to the west. As many as 100 workers take 12-hour shifts, around the clock, during a

major storm. The station's 82-room dormitory can accommodate and feed 160 people.

The Donner Pass area and its typically deep snows offers an excellent testing ground for new snow-clearing equipment. This winter, for example, crews have been trying out a "tow-plow" that essentially doubles the lane-clearing capacity of a standard heavy-duty plow, clearing two lanes at once.

A newer generation of de-icing equipment is also getting a workout by Kingvale crews this heavy winter. The Epoke spreader can treat highways with ice-melting brine solution, salts, and abrasive materials not possible before with earlier models of de-icing equipment. Also, a new model of "pusher" truck that shoves stalled big rigs to safety – and keeps millions of dollars of commerce moving over Donner Pass – is stationed at Kingvale as part of a partnership with the California Trucking Association and California Highway Patrol.

Kingvale station features two massive repair and storage bays, each stocked with full array of tools,



Caltrans photo by Peter Asano



Caltrans photo by Steven Hellon



Caltrans photo by Steven Hellon

Although the times and equipment have changed at Caltrans maintenance stations, the mission of keeping roads clear and safe has not. **At left**, the Kingvale communications center in the 1960s relied on intercoms and phone switchboard, a far cry from today's high-tech center, where, **top right**, Jenny Vigarino, dispatcher clerk, seated, and Dispatch Supervisor Laurie James work. **At right**, snowplows are chained up, ready to go.

parts and equipment to keep the snow-clearing effort moving. The bays' heated floors serve multiple, critical purposes: to melt ice off the vehicles returning from the snowy roads, keep vehicle brakes from freezing, and modulate temperatures inside as vehicles pull in and out of the facility. Covered enclosures nearby are stocked and replenished with tons of salts and sand for use as road de-icer and traction control.

Another building on the grounds serves as Caltrans' snow communications hub for the I-80 corridor. The Kingvale Communication Center (KSCC) coordinates Caltrans radio traffic, operates the Changeable Message Sign system, and feeds information to the Caltrans website's QuickMap feature.

In keeping with its location and elite reputation, "Kingvale University," dubbed "Snowfighter University," was established many years ago at the maintenance station to train Caltrans workers from around the state in the latest snow-clearing techniques.

No doubt those skills have been put to good use during this drought-busting season. **MM**



Caltrans photo by Peter Asano

How things have changed: Back in the early days of the Kingvale operation, it obviously was OK to smoke while working. The facility opened in 1962 along one of the Sierra's snowiest sections.